Numerical Implementation of the 10-Moment Two Fluid Model

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at the University of Washington — The set of 10-moment fluid equations for the
two fluid plasma model is examined and numerically implemented. The equation
set is derived by taking the first three moments of the Vlasov equation. A 1-D
harris current sheet equilibrium is explored, using the MacCormack algorithm. For
an equilibrium, the pressure tensor for both fluids must be isotropic. If the current
is carried only by electrons, an E-field is required to provide ion confinement. Sim-
ulations performed reveal whether the plasma maintains isotropic pressure in the
absence of collisions. The results are compared to five moment two fluid simulation
results.

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